

# *Helicobacter pylori* prevalence among medical students in a high endemic area

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## ABSTRACT

**Objective:** To evaluate the prevalence of *Helicobacter pylori* (*H. pylori*) among Saudi medical students.

**Methods:** Volunteer medical students were randomly selected in the College of Medicine, King Saud University, Riyadh, Saudi Arabia from January 2005 to May 2005. A urea breath test (UBT) was performed for each medical student. Important demographic data was recorded. Each student had to answer a questionnaire on upper gastrointestinal (UGI) symptoms before the UBT.

**Results:** A total of 120 students were recruited (73 males [61%] and 47 females [39%]) with a mean age of 22.2 years (age varied from 18 to 28 years). The prevalence of *H. pylori* was surprisingly low at 35%, compared to a previously reported high prevalence among the Saudi population (80%). Thirty-one percent of medical students reported  $\geq 1$  UGI symptom with no significant differences between the positive and negative UBT results. Although there was a trend, there was no significant prevalence difference between the preclinical and the clinical group of students.

**Conclusion:** We found a low prevalence of *H. pylori* in our young university medical student's population. The low prevalence of *H. pylori* in this young population may have important clinical and economic implications.

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*Helicobacter pylori* (*H. pylori*) is the most common chronic bacterial infection in humans.<sup>1</sup> It plays a crucial etiologic role in many diseases of the upper gastrointestinal (UGI) tract, ranging from dyspeptic symptoms, gastritis,

peptic ulcer disease (PUD) to gastric cancer and lymphoma.<sup>2</sup> The prevalence of *H. pylori* in developing countries ranges from 70-90% while in developed countries reports vary between 25% to 50%.<sup>3,4</sup> In developed countries, such as the United States, serologic evidence of *H. pylori* is rarely found before age 10 but increases to 10% in those between 18 and 30 years of age and to 50% in those >60 years.<sup>1</sup> In 1990, Al Moagel et al,<sup>5</sup> reported that 40% of the Saudi population in the age group of 5-10 years and 70% of people  $\geq 20$  years of age had *H. pylori*,<sup>5</sup> which makes it one of the highest endemic areas in the world. Colonization with this bacterium usually occurs in early childhood and is correlated with the socioeconomic parameters such as crowded living conditions,<sup>1,6</sup> while transmission in adulthood has been reported to be 0.5-1% annually.<sup>7</sup> There has been much debate about health care providers being at an increased risk for acquiring *H. pylori* from contact with patients, their body fluids and excreta. Gastroenterologists and nurses appear to be at increased risk for acquiring *H. pylori*; this is presumably due to occupational exposure to infected gastric secretions.<sup>8,9</sup> On the contrary, other studies showed no increase in the prevalence among dentists and dental nurses.<sup>10</sup> In a Brazilian study looking at the prevalence of *H. pylori* in 1,119 medical students throughout various stages of their medical training, it was found that there is an increased prevalence from 23.4% as students to 38.6% as residents.<sup>11</sup> The aim of our study was to determine the current *H. pylori* prevalence among Saudi medical students and its relationship to exposure to patients.

**Methods.** The study was carried out at King Khalid University Hospital, Riyadh, Saudi Arabia from January 2005 to May 2005. Volunteer medical students from different levels of medical school (grade 1 to 5) as well as house officers were selected to participate in the study.

Participants were classified into 2 groups: preclinical medical students (1st and 2nd year) and clinical medical students (3rd, 4th, 5th year and house officers). At first, the participants were asked to fill out a questionnaire to help ascertain risk factors for infection. We asked about important demographic data, levels of medical school (grade 1 to 5), gastrointestinal symptoms in the last month and any previous history of peptic ulcer disease (PUD), gastroesophageal reflux disease (GERD), diabetes mellitus (DM), hypertension (HTN) or irritable bowel syndrome (IBS). The gastrointestinal symptoms queried were weight loss, bloating, early satiety, having excessive abdominal gases, dysphagia, odynophagia, heartburn and abdominal pain. We also asked about previous history of *H. pylori* infection, any previous endoscopic procedures, any family history of PUD or gastrointestinal malignancy and personal habits such as hand washing before and after examining patients, smoking and medication use (proton pump inhibitors, antacids, non-steroidal anti-inflammatory drugs [NSAIDs] and antibiotics). Each participant underwent a 13C-urea breath test of identical protocol using the non-radioactive 13C test (Meretek, Otsuka pharmaceuticals). All participants were off antibiotics for 4 weeks and off proton pump inhibitors for at least 2 weeks. Participants were asked to breath in an empty breath bag to obtain base line values, and then they were asked to repeat the test after half an hour from ingesting the test solution that contained 100 mg of 13C-urea. The cut-off value was set at  $\Delta 2.5\%$  20/min. Associations between the prevalence and each independent variable were obtained. We used Fisher's exact test to assess if this association was statistically significant. All p values were 2-tailed, and  $p < 0.05$  were considered statistically significant.

**Results.** A total of 120 students were recruited, 73 males (61%) and 47 females (39%) with a mean age of 22.2 years (age varied from 18 to 28 years). Twenty-four of them (20%) were first year medical students, 17 (14%) second year students, 28 (23%) third year students, 11 (9%) fourth year students, 25 (21%) fifth year students and 15 (13%) house officers. Of the 120 medical students studied, 41 (34%) were preclinical medical students (1st and 2nd year) and 79 of them (66%) were clinical medical students (3rd, 4th, 5th year and house officers). Forty-two of our medical students had a positive 13C-UBT (35%) (Table 1). Although, there were no statistically significant difference between *H. pylori* positive and *H. pylori* negative groups in terms of age, gender, gastrointestinal symptoms, smoking, medications intake or past medical history of GERD or IBS, all patients who had history of previous PUD were *H. pylori* positive ( $p=0.006$ ). There was no statistically

difference between the *H. pylori* prevalence among the clinical student group compared to the preclinical group ( $p=0.34$ ) or the prevalence rate between male (34%) and female (38%) students. There was no significant increase of *H. pylori* prevalence with increasing age. There was no increase of *H. pylori* prevalence among students who were complaining of gastrointestinal symptoms compared to asymptomatic students. Although it was not statistically significant ( $p=0.3$ ), there was an increased of *H. pylori* prevalence in medical students who were borne in the Middle East (40 out of 106 [37%]) when compared to those who were born in western countries (2 out of 14 [14%]).

**Discussion.** Epidemiological studies have revealed significantly higher prevalence rates of *H. pylori* infection in doctors and nurses than in the general population, which makes medical practice a risk factor for *H. pylori* contamination among health care professionals.<sup>12-14</sup> Our study showed that the prevalence of *H. pylori* infection in Saudi medical students (38%) was much lower than previously reported<sup>5</sup> in a similar age group of the general

**Table 1** - Comparison of *Helicobacter pylori* (*H. pylori*)-positive and *H. pylori*-negative medical students.

Characteristics	<i>H. pylori</i> positive (n=42)	<i>H. pylori</i> negative (n=78)	P value
Male	25	48	0.98
Female	17	30	0.98
Change in appetite	15	28	0.91
Weight change	13	29	0.2
Indigestion	9	13	0.72
Abdominal bloating	15	23	0.65
Abdominal pain	12	17	0.57
Heartburn	17	25	0.95
Early satiety	13	22	0.92
Change in bowel habits	9	19	0.69
History of PUD	5	0	0.006
Gastroesophageal reflux	3	6	0.6
Irritable bowel syndrome	9	10	0.35
Upper GI endoscopy	5	2	0.05
Hand washing before eating	41	76	0.29
Smoking	2	8	0.24
NSAID	4	8	0.6
Previous Hp	2	0	0.119

\*p-value using Fisher's exact test.  
NSAID - Non-steroidal anti-inflammatory drugs,  
PUD - peptic ulcer disease

population in Saudi Arabia in 1990 (70% of people >20 years had *H. pylori*), which was also suggested by other studies among dyspeptic and Saudi patients with peptic ulcer disease (range from 50-70%).<sup>15-17</sup> Although this decline in prevalence of *H. pylori* appears to parallel economic improvement in Saudi Arabia over the last 20 years and probably to the difference in method of diagnosis of *H. pylori* infection (serology versus UBT in our study), it might represent the higher socioeconomic status of most of our medical students. Surprisingly, the *H. pylori* prevalence in our Saudi medical students was not only lower than that in the general population but it was also lower than that reported in Irish<sup>18</sup> medical students (59%) and American gastroenterologist (53%).<sup>19</sup> Although not statistically significant (due to small sample), there was a trend increase of *H. pylori* prevalence with increasing age and increasing level of school. This finding is consistent with Melo et al's study on 1119 Brazilian medical students,<sup>11</sup> where they found that *H. pylori* seroprevalence was 31% and it was significantly increased during the post graduation years compared to graduation course (23% among students versus 39% among residents). Prevalence as well increased with age suggesting that contact with patients may constitute a risk factor for acquiring *H. pylori* infection. This is supported by Wilhoite et al<sup>9</sup> who identified a significant increase of seroprevalence rates associated with age in nurses, varying from 25%, in the 20 to 34 years of age group, up to 71%, in the group more >50 years of age. Similar results were observed by Liu et al<sup>13</sup> within endoscopy professionals. In this study, we asked about many gastrointestinal risk factors and found that there was no correlation between upper gastrointestinal symptoms and *H. pylori* infection. The only significant association with *H. pylori* was having a past history of PUD. This suggests lack of appropriate *H. pylori* eradication among these subjects.

In conclusion, this study reveals that *H. pylori* infection prevalence among our medical students was much less than previously reported among the general Saudi population 20 years ago and there were a trend increase of *H. pylori* prevalence as the medical student level increased from preclinical to clinical stages and with increasing of age.

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